

CLAIMS

We claim:

1. A data communication system for providing data communications between a data network and a user data terminal, comprising:

at least one cluster of data communication stations moving with respect to each other, the user data terminal being linked to a data communication system in the cluster, and

an assignment mechanism for dynamically assigning at least one of the data communication stations in the cluster with a function of a cluster controller to transmit data packets from the data network to at least one other data communication station in the cluster.

2. The system of claim 1, wherein the cluster controller function is assigned for a predetermined time interval.

3. The system of claim 1, wherein the cluster controller function is assigned based on a current location of the data communication station being assigned.

4. The system of claim 1, wherein the cluster controller function is assigned based on a predicted location of the data communication station being assigned.

5. The system of claim 1, wherein the cluster controller function is assigned based on ability of the data communication station being assigned to provide data communications between the data communication stations in a predetermined geographic area.

6. The system of claim 1, wherein the cluster controller function is assigned based on ability of the data communication station being assigned to provide data communications between the maximum number of the data communication stations in the cluster.

7. The system of claim 1, wherein the cluster controller function is assigned based on ability of the data communication station being assigned to provide data communications with predetermined data communication stations in the cluster.

8. The system of claim 1, wherein the assignment mechanism is configured to direct a data communication station in the cluster to perform the cluster controller function.

9. The system of claim 1, wherein the assignment mechanism is configured to enable a data communication station in the cluster to request the cluster controller function.

10. The system of claim 1, wherein the assignment mechanism is configured to assign the cluster controller function based on position data describing current and anticipated positions of the data communication stations.

11. The system of claim 10, wherein the position data include air traffic control data describing four-dimensional physical location of aircraft carrying a data communication station.

12. The system of claim 1, wherein the data communication station is linked to a local area network including the user data terminal.

13. The system of claim 1, wherein the data communication station includes a receiver for receiving a data communication signal carrying data from the data network.

14. The system of claim 12, wherein the data communication station further includes a transmitter and a receiver for providing data communications with other data communication stations.

15. The system of claim 1, wherein multiple clusters of data communication stations are provided.

16. The system of claim 1, wherein the data network includes the Internet..

17. The system of claim 1, wherein the data network includes a private network.

18. The system of claim 1, wherein the data network includes a public network.

19. The system of claim 1, wherein at least one data communication station is carried on an airborne platform.

20. The system of claim 19, wherein the trajectory of the airborne platform is independent from and not controlled by the system of claim 1.

21. The system of claim 19, wherein the airborne platform is able to periodically return to ground.

22. The system of claim 1, wherein at least one data communication station in the cluster is included in multiple virtual data communication networks.

23. In a data communication system for providing transmission of data packets between a data network and a cluster of data communication stations moving with respect to each other, a data communication station of the cluster comprising:

receiving and transmitting circuitry for providing data communications with other data communication stations and with the data network,

the communication station being dynamically assigned to operate as a cluster controller during a predetermined time interval to receive data packets from the data network for transmission to another data communication station in the cluster.

24. The data communication station of claim 23, wherein the receiving and transmitting circuitry is configured for receiving an assignment signal to assign the communication station as the cluster controller.

25. The data communication station of claim 24, wherein the assignment signal is provided by a central controller.

26. The data communication station of claim 24, wherein the assignment signal is provided by one of the communication stations in the cluster.

27. The data communication station of claim 26, wherein the assignment signal is provided by a data communication station operating as the cluster controller during a previous time interval.

28. A method of data communications between a data network and a user data terminal linked to a data communication station in a cluster of data communication stations moving with respect to each other, the method comprising the steps of:

assigning a function of a first cluster controller to a first data communication station in the cluster, to enable the first data communication station to transmit first data packets from the data network to other data communication stations in the cluster in a first predetermined time period, and

assigning a function of a second cluster controller to a second data communication station in the cluster, to enable the second data communication station to transmit second data packets from the first cluster controller to other data communication stations in a cluster of the second cluster controller in a second predetermined time period.

29. The method of claim 28, wherein a cluster controller function is assigned by a central controller.

30. The method of claim 29, wherein the second data communication station is assigned with the cluster controller function by the first data communication station.

31. The method of claim 30, wherein a data communication signal sent from the second data communication to a third data communication station after the second data communication station is assigned with the cluster controller function is received by the first data communication station as an acknowledgement signal.

32. A data communication system for providing data communications between a data network and a user data terminal, comprising:

at least one cluster of data communication stations moving with respect to each other, the user data terminal being linked to a data communication system in the cluster, and

an assignment mechanism for dynamically assigning at least one of the data communication stations in the cluster with a function of a cluster controller to transmit to the data network a data packet received from at least one other data communication station in the cluster.

33. A method of data communications between a data network and a user data terminal linked to a data communication station in a cluster of data communication stations moving with respect to each other, the method comprising the steps of:

assigning a function of a first cluster controller to a first data communication station in the cluster, to enable the first data communication station to transmit to the data network first data packets received from other data communication stations in the cluster in a first predetermined time period, and

assigning a function of a second cluster controller to a second data communication station in the cluster, to enable the second data communication station to transmit to the first cluster controller second data packets received from other data communication stations in a cluster of the second cluster controller in a second predetermined time period.